CLAIMS

What is claimed is:

1. A substrate processing apparatus having a station for loading and unloading substrates from the apparatus, the station comprising:

an aperture closure for sealing a loading and unloading aperture of the station;

apparatus for removing a door of a substrate magazine and thus opening the substrate magazine, and for operating the aperture closure to open the aperture; and

an elevator for precisely positioning the open substrate magazine along a vertical axis within a usable range of motion.

2. The substrate processing apparatus of claim 1, wherein the elevator operates such that a substrate within the open magazine is positioned substantially in a wafer transport plane, the substrate processing apparatus further comprising a transport apparatus for accessing the substrate in the wafer transport plane through the aperture.

3. The substrate processing apparatus of claim 2, wherein the elevator includes a device for positioning the open substrate magazine such that substantially no vertical movement is required by the transport apparatus.

4. The substrate processing apparatus of claim 1, further comprising a substrate buffer for temporary substrate storage.

5. The substrate processing apparatus of claim 1, wherein the station further comprises at least one peripheral area and a central area.

6. The substrate processing apparatus of claim 5, further comprising a buffer transport for positioning one or more substrate magazines along a second axis oriented in a second direction.

7. The substrate processing apparatus of claim 6, wherein the buffer transport is operable to place the one or more magazines in the at least one peripheral area and the central area.

8. The substrate processing apparatus of claim 7, wherein the elevator is operable to move the one or more magazines placed in the central area.

9. The substrate processing apparatus of claim 1, wherein the station further comprises a sensor for mapping vertical locations of the substrates.

10. The substrate processing apparatus of claim 9, wherein the sensor is mounted to a frame of the station and an is capable of mapping the vertical location while the elevator is precisely positioning the open substrate magazine along the vertical axis.

11. The substrate processing apparatus of claim 9, wherein the sensor is rotatably mounted on a frame of

the station such that upon removal of a door of the magazine, the sensor extends inside the magazine.

12. The substrate processing apparatus of claim 1, wherein the station further comprises a shuttle for transporting the one or more magazines along a third axis oriented in a third direction different from the first and second directions.

13. The substrate processing apparatus of claim 1, wherein the station further comprises a mini-environment for interfacing the station to the substrate processing apparatus.

14. The substrate processing apparatus of claim 9, wherein the sensor is mounted to a magazine door drive of the station.

15. The substrate processing apparatus of claim 14, wherein the magazine door drive is a fluidic drive.

16. The substrate processing apparatus of claim 14, wherein the magazine door drive is a pneumatic drive.

17. The substrate processing apparatus of claim 14, wherein the sensor is operable to map the substrate locations while the elevator is positioning the open substrate magazine along the vertical axis.

18. The substrate processing apparatus of claim 14, further comprising an encoder mounted on the elevator for providing elevator vertical position information.

19. The substrate processing apparatus of claim 18, wherein the substrate locations are determined by

recording the elevator vertical position information when the sensor detects an individual substrate.

20. The substrate processing apparatus of claim 14, wherein the sensor is operable to map the substrate locations during an operation of the magazine door drive.

21. The substrate processing apparatus of claim 14, further comprising an encoder positioned to provide magazine door drive position information.

22. The substrate processing apparatus of claim 21, wherein the substrate locations are determined by processing the magazine door drive position information when the sensor detects an individual substrate.

23. A substrate processing apparatus having a station for loading and unloading substrates from the apparatus, the station comprising:

a loading and unloading aperture; and

a magazine door drive for opening a substrate magazine by removing a door of a substrate magazine through the loading and unloading aperture.

24. The substrate processing apparatus of claim 23, further comprising a transport apparatus for accessing substrates in the substrate magazine through the loading and unloading aperture.

25. The substrate processing apparatus of claim 23, further comprising a substrate buffer for temporary substrate storage.

26. The substrate processing apparatus of claim 23, wherein the station further comprises at least one peripheral area and a central area.

27. The substrate processing apparatus of claim 23, further comprising a buffer transport for positioning the substrate magazine in the at least one peripheral area and the central area.

28. The substrate processing apparatus of claim 23, wherein the station further comprises a mini-environment for interfacing the station to the substrate processing apparatus.

29. The substrate processing apparatus of claim 23, wherein the station further comprises a sensor for mapping vertical locations of the substrates.

30. The substrate processing apparatus of claim 29, wherein the sensor is rotatably mounted on a frame of the station such that upon removal of a door of the magazine, the sensor extends inside the magazine.

31. The substrate processing apparatus of claim 29, wherein the sensor is mounted to a magazine door drive of the station.

32. The substrate processing apparatus of claim 31, wherein the magazine door drive is a fluidic drive.

33. The substrate processing apparatus of claim 31, wherein the magazine door drive is a pneumatic drive.

34. The substrate processing apparatus of claim 31, wherein the sensor is operable to map the substrate

locations during an operation of the magazine door drive.

35. The substrate processing apparatus of claim 31, further comprising an encoder positioned to provide magazine door drive position information.

36. The substrate processing apparatus of claim 35, wherein the substrate locations are determined by processing the magazine door drive position information when the sensor detects an individual substrate.